



# ICAO ENGINE EXHAUST EMISSIONS DATA SHEET

## SUBSONIC ENGINES

ENGINE IDENTIFICATION:	Trent 1000-L3	BYPASS RATIO:	9.0
UNIQUE ID NUMBER:	02P23RR133	PRESSURE RATIO ( $\pi_{co}$ ):	46.0
COMBUSTOR:	Phase5 Tiled		
ENGINE TYPE:	TF	RATED THRUST ( $F_{oo}$ ) (kN):	334.7

### REGULATORY DATA

CHARACTERISTIC VALUE:	HC	CO	NO <sub>x</sub>	SMOKE NUMBER
$D_p/F_{oo}$ (g/kN) or SN	0.0	9.0	68.2	16.4
AS % OF ORIGINAL LIMIT	0.0	7.6	51.6	96.4
AS % OF CAEP/2 LIMIT (NO <sub>x</sub> )			64.6	
AS % OF CAEP/4 LIMIT (NO <sub>x</sub> )			68.9	
AS % OF CAEP/6 LIMIT (NO <sub>x</sub> )			74.9	
AS % OF CAEP/8 LIMIT (NO <sub>x</sub> )			83.0	

For non-volatile particulate matter (nvPM) emissions, please refer to the ICAO Engine nvPM Emissions Data Sheet.

### DATA STATUS

- PRE-REGULATION  
 x CERTIFICATION  
 - REVISED (SEE REMARKS)

### TEST ENGINE STATUS

- NEWLY MANUFACTURED ENGINES  
 x DEDICATED ENGINES TO PRODUCTION STANDARD  
 - OTHER (SEE REMARKS)

### EMISSIONS STATUS

x DATA CORRECTED TO REFERENCE  
 (ANNEX 16 VOLUME II)

### CURRENT ENGINE STATUS

(IN PRODUCTION, IN SERVICE UNLESS OTHERWISE NOTED)  
 - OUT OF PRODUCTION (DATE: - )  
 - OUT OF SERVICE (DATE: - )

### MEASURED DATA

MODE	POWER SETTING (% $F_{oo}$ )	TIME (minutes)	FUEL FLOW (kg/s)	EMISSIONS INDICES (g/kg)			SMOKE NUMBER
				HC	CO	NO <sub>x</sub>	
TAKE-OFF	100	0.7	2.556	0.00	0.42	55.28	8.2
CLIMB OUT	85	2.2	2.090	0.00	0.42	41.46	11.4
APPROACH	30	4.0	0.687	0.00	0.61	14.26	9.3
IDLE	7	26.0	0.256	0.00	6.51	5.79	1.9
LTO TOTAL FUEL (kg) or EMISSIONS (g)			947	0	2860	22034	-
NUMBER OF ENGINES				8	8	8	8
NUMBER OF TESTS				18	18	18	18
AVERAGE $D_p/F_{oo}$ (g/kN) or AVERAGE SN (MAX)				0.0	8.5	65.8	14.7
SIGMA ( $D_p/F_{oo}$ in g/kN, or SN)				0.0	1.7	0.8	2.0
RANGE ( $D_p/F_{oo}$ in g/kN, or SN)				0.0	5.47-10.65	64.73-66.95	11.4-16.7

### ACCESSORY LOADS

POWER EXTRACTION	0	(kW)	AT	-	POWER SETTINGS
STAGE BLEED	0	(% CORE FLOW)	AT	-	POWER SETTINGS

### ATMOSPHERIC CONDITIONS

BAROMETER (kPa)	98.9-102.1
TEMPERATURE (K)	280.4-303.5
ABS HUMIDITY (kg/kg)	0.00308-0.01917

### FUEL

SPEC	
H/C	1.92
AROM (%)	16.89

MANUFACTURER: Rolls-Royce plc  
 TEST ORGANIZATION: Rolls-Royce plc  
 TEST LOCATION: Derby  
 TEST DATES: 24/09/2009-28/08/2019

### NO<sub>x</sub> REGULATION PARAGRAPH

	2.3.2 c) (CAEP/4)
	2.3.2 d) (CAEP/6)
x	2.3.2 e) (CAEP/8)

### REMARKS

1. Representative of Trent 1000-TEN engines
2. EDNS01000935986

Compliance with Fuel Venting requirements:

x ('x' if complies, 'PR' if pre-regulation, '-' if information is not available)